

# Samira Malek

## Curriculum Vitae

Department of Computer Science and Engineering

Pennsylvania State University, Pennsylvania, USA

+1 (415) 715-7956

✉ samiramalek30@gmail.com

🌐 <http://SamiraMalek.github.io>

### Education

- 2018–2020 **Master of Electrical Engineerings, Communications System**, Sharif University of Technology, Tehran, Iran, *GPA – 3.61 out of 4 (16.97/20)*.  
Ranked as [1<sup>st</sup> university in Iran](#) based on QS Ranking.
- 2013–2018 **Bachelor of Electrical Engineerings, Communications**, Sharif University of Technology, Tehran, Iran, *GPA – 3.37 out of 4 (16.37/20)*.
- 2009–2013 **Diploma in Mathematics and Physics**, Farzanegan High school (Administered by National Organization for Development of Exceptional Talents (NODET)), Tehran, Iran, *GPA – 4 out of 4*.

### Work Experience

- 2023–present **Research & Teaching Assistant**, Computer Science & Engineering Department, Pennsylvania State University, Pennsylvania, United State of America.
- 2022 **Senior Data Scientist**, Customer Relationship Management (CRM) Department, SNOWA COMPANY, Tehran, Iran..  
Selected Projects: • Customers Clustering • Finding Families • Data Warehouse Designing

### Research Interests

- Machine Learning
- Statistical Models
- Deep Learning
- Optimization

### Honors and Awards

- 2022 Awarded the College of Engineering Dean's Office scholarship at **Pennsylvania State University**.
- 2018 **Ranked 29<sup>th</sup>** in the Iran Nation-wide University Entrance Exam Known as Konkoor for M.Sc degree, among +40,000 test-takers.
- 2013 **Ranked 40<sup>th</sup>** in the Iran Nation-wide University Entrance Exam Known as Konkoor for B.Sc degree, among +250,000 test-takers.
- 2012 **Silver Medalist** of 30<sup>th</sup> Iran National Mathematical Olympiad.
- 2009 Become a member of **National Organization for Development of Exceptional Talents (NODET)**.

### Thesis

#### Master Thesis

- Title **Using Deep Neural Networks for Decoding Linear Codes**
- Supervisors Prof. Amini & Prof. Salehkaleybar
- Description Decoding is treated as a classification problem at this approach, which is doomed by the curse of high dimensionality of training data. Afterwards, I used the belief propagation algorithm to design neural networks based on factor graph of codes which helps to solve the high dimensionality problem of data and optimize decoding algorithms. The proposed algorithms both improve the performance in terms of bit error rate and reduce the computational complexity of decoding with respect to previous works.

#### Bachelor Thesis

- Title **Diagnosis of Eye Diseases by Using Recorded Signals from The Neural Retina**
- Supervisor Prof. Hajipour
- Description I explored the physiology of the Neural Retina and investigated how neurons would respond to different stimuli in experiments. I worked on recorded MicroElectroRetinoGram (MERG) signal from mice. Afterwards, I wrote a code that could denoise a recorded signal and distinguish a healthy retina from unhealthy.

### Publications

- Published **Samira Malek**, Saber Salehkaleybar, Arash Amini, "**Multi Variable-layer Neural Networks for Decoding Linear Codes**", Iran Workshop on Communication and Information Theory (IWCIT), IEEE, 2020.
- Preprint **Samira Malek**, Saber Salehkaleybar, Arash Amini, "**A Deep Neural Network Architecture for Decoding Linear Codes Based on the Parity Check Matrix**" to be submitted (it's available [here](#)).

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## Selected Courses

### Pennsylvania State University:

- Distributed Optimization (A)
- Large Scale Machine Learning
- Deep Learning for NLP (A-)
- Algorithm Design and Analysis

### Sharif University of Technology:

- AI and Biological Computation (A+)
- Signal & System (A)
- Speech Processing (A+)
- Information hiding (A+)
- Engineering Probability and Statistics (A)
- Numerical Computation (A+)
- Digital Signal Processing(II) (A)
- Digital Communication (A)

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## Selected Academic Projects

- Spring 2023 **Implementation of Stochastic Gradient Descent Ascent (SGDA) & Stochastic Compositional gradient (SCSC)** for MinMax optimization in Python, as a project of *Distributed Optimizatio* course, Under supervision of Prof. Ying Sun.
- Spring 2023 **Training GPT by Prompting for multi-hop question answering task on HotPotQA** in Python, as a project of *Deep Learning for NLP*, Under supervision of Prof. Rui Zhang.
- Spring 2020 **Implementation of Viterbi algorithm & Reduced Complexity Viterbi Sequence Detector** in MATLAB, as a project of *Advanced Communication System* course, Under supervision of Prof. NasiriKenari.
- Spring 2019 **Implementation of a FeedForward and a Recurrent Neural Networks for Pitch Tracking in Noisy Speech** in Keras, **Extraction pitch contours by SIFT, HPS, and AMDF algorithms** in MATLAB as projects of *Speech Processing* course, Under supervision of Prof. Ghaemmaghami.
- Fall 2018 **Implementation of BFGS, Steepest Descent and Newton Algorithm** in MATLAB, as projects of *Numerical Optimization Methods* course, Under supervision of Prof. BabaieZadeh.
- Fall 2018 **Recovering an image by IMAT and OMP algorithms, Reconstruction of 1-D and 2-D Signals by SDFT and RS Methods** in MathCad, as projects of *Digital Signal Processing(II)* course, Under supervision of Prof. Marvasti.
- Spring 2016 **Design a Neural Network for Classification Right-handed and Left-handed Typing, with EEG Signal** in MATLAB, as a project of *AI & Biological Computation* course, Under supervision of Prof. Hajipour.
- Fall 2013 **Implementation of a Semi-iudo Graphical Game** in C Language, as a project of *Introduction to Programming* course, Under supervision of Prof. TaherKhani.

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## Teaching Experiences

- Fall 2023 Teaching Assistant for **Discrete Mathematics** at Pennsylvania State University.
- Spring 2023 Teaching Assistant for **Discrete Mathematics** at Pennsylvania State University.
- Fall 2019 Teaching Assistant for **Signal & System** at Sharif University of Technology.
- Spring 2019 Teaching Assistant for **Stochastic Random Process** at Sharif University of Technology.
- Spring 2019 Teaching Assistant & MATLAB Teaching for **Engineering Mathematics** at Sharif University of Technology.
- 2017–2018 Design **Mock Test** of the Iran Nation-wide University Entrance Exam Known as Konkoor for B.Sc degree in [Kanoon Institution](#), which has the most participants in Iran (more than +20,000 students every year).
- 2014–2015 Teaching **Mathematics** at Farzanegan High school (NODET), Preparing students for Iran National Mathematical Olympiad.

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## Computer Skills

- Languages Python , MATLAB, SQL, C/C++, L<sup>A</sup>T<sub>E</sub>X, HTML
- Softwares Anaconda, Microsoft Power BI, Misrosoft SQL Server Management

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## Languages

- English **TOEFL iBT: 95**  
**GRE General: 317, Writing: 3.5**–November 2021
- Native • Persian • Azerbaijani

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## Reference

References available upon request.